

The North American Species of *Triploechus* Edwards

(Diptera: Bombyliidae)

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Prior to Hull's 1973 studies of bombyliid genera, *Triploechus* Edwards was considered by most American workers to be a subgenus of *Heterostylum* Macquart. Paramonov (1947) had more or less established the generic validity of *Triploechus*, but he was never followed.

Perhaps some of the uncertainties of *Triploechus* as a distinct genus in North America lie in the fact that the genus was originally described from Chile. The two North American species were placed at that time in either *Bombylius*, *Heterostylum* or *Triplasius*. Painter, 1940 possibly unaware of Edwards' 1936 description of *Triploechus* placed all the North American species in *Heterostylum*, removed *novum* Williston from *Triplasius* Loew and synonymized *Bombylius recurvus* Coquillett with *novum*.

Paramonov (1947) was the first to point out reliable differences between *Triploechus* and *Heterostylum* and placed Loew's *Triplasius* in synonymy with *Bombylius*. Hull (1973) considers *Triplasius* a subgenus of *Bombylius*.

Triploechus was established by Edwards on the basis of the indented posterior margin of the eye, the short pulvilli and the presence of three submarginal cells in the wings. These characteristics are possessed by all of the South American species but not by all of the North American forms. Hull's recharacterization of *Triploechus* is readily available and need not be reiterated here, but in the light of present knowledge a few changes need to be made. Possibly of more significance than the number of submarginal cells is the course of vein R_{2+3} , the presence of the upper intercalary vein or medial crossvein at the base of the second posterior cell, the width of the head and the configuration of the male genital armature. A study of all the North and South American species of *Heterostylum* and *Triploechus* has led to the conclusion that *Triploechus* is a valid genus.

Most of the North American forms in *Triploechus* will not run to that genus in Hull's key to genera primarily because most have only two submarginal cells. Vein R_{2+3} is always curved upward apically or recurved and meets the costa at a right angle or less in *Triploechus*. Also in *Triploechus* the upper intercalary vein is nearly always present

even though shorter than the r-m crossvein. It is never or rarely present in *Heterostylum*. In conjunction with these differences in venation the head in *Triploechnus* species is never wider than the thorax while in *Heterostylum* it is always as wide as or wider than the width of the thorax. There are also differences to be found in the configuration of the male genitalia especially in the shape of the epiphallus.

Differences other than the number of submarginal cells between the North and South American species of *Triploechnus* should be mentioned in order to establish a broader base for the genus. The North American species never have the costa tuberculate while in all the South American species this is the normal condition although a number of specimens of *bellus* (Philippi) have a smooth costa. The pulvilli in the North American species are much longer than those found in the South American forms except *novus*. Other than *novus*, the northern species are much smaller than their southern cousins. These smaller specimens actually resemble, in habitus, *Bombylius* more than *Heterostylum*. *T. novus* and the Chilean species *heteroneurus* (Macquart) are remarkably similar but rather easily separated by the male genitalia.

The new species described herein are all similar in habitus. As stated above they resemble *Bombylius* species more than *Triploechnus* species. In some respects they occupy an intermediate position between *Bombylius*, *Heterostylum* and *Triploechnus* sharing characteristics with all three genera. They are placed in *Triploechnus* on the basis of the indented posterior margin of the eye, the apically upward curvature of vein R₂₊₃ and the male genitalia, although it should be mentioned that the genitalia of *sackeni* (Williston) approaches that of *Heterostylum*.

KEY TO THE MALES OF *TRIPLOECHUS*

- 1. Eyes separated, usually only narrowly so by less than width of median ocellus 2
- Eyes contiguous; arista distinctly two segmented; pulvilli short, less than half the length of the claws *novus* (Williston)
- 2. Legs mostly fulvous, femora may be dusky at base or middle 3
- Legs black, tibiae may be testaceous at most *sackeni* (Williston)
- 3. Black hairs present on underside of hind femora and usually on mid femora; first antennal segment fulvous with black hairs above *stagei* new species
- Legs entirely white pilose; basal antennal segment black with white hairs above *luridus* new species

KEY TO THE FEMALES OF *TRIPLOECHUS*

- 1. Legs black, tibiae testaceous at most 2
- Legs fulvous, femora dusky toward base at most; first antennal segment fulvous with yellow hair *stagei* new species

2. Hind femora with at most a few bristles on apical half; pulvilli more than half as long as claws 3
- Hind femora with strong bristles along the ventral surface; pulvilli less than half as long as claws *novus* (Williston)
3. Abdominal segments two to seven with black hairs on posterior margin; body pile in general whitish *sackeni* (Williston)
- Body pile predominately yellowish, no black hairs on the abdomen *luridus* n. sp.

TRIPLOECHUS SACKENI (Williston), new combination

Comastes sackeni Williston, 1893: 255.

Heterostylum sackeni, Painter, 1930: 3, Painter and Painter, 1965: 411.

Williston's type female in the Snow Collection at the University of Kansas is in fair condition, but one wing, four legs and one antenna are missing; however the body vestiture is quite intact. In general it is a little larger than most of the specimens before me and the color of the wings is quite light.

Since the original description is short and incomplete and of the female only, the male and female of this species are herein redescribed completely.

Male.—Small, 6–7 mm. Ground color dull grayish, in some lights with a greenish cast, head cinereous, tibiae brownish to dark testaceous; occasionally with three gray longitudinal stripes on thoracic dorsum. Eyes separated by a little less than width of median ocellus. First antennal segment five times length of second segment, with black and white hair above, white hair at sides and below, second segment bare, one-third wider than long; third segment four times longer than first, linear, gradually tapering from base to apex, arista terminal, small, shorter than width of third segment at apex. Head white pilose with a few black hairs on ocellar tubercle and upper half of face on each side of antennae. Proboscis projecting beyond oral margin for a distance more than length of hind femur. Palpi short with short white hair. Thorax and scutellum white pilose with scattered black hair present on former, tomentum wanting, bristles white. Legs with white hair and tomentum, bristles testaceous; pulvilli more than half as long as claws. Halter stem testaceous, knob white. Squama brownish with fringe of long white hair. Widened base of costa with black setulae, costa without tubercles. Wing hyaline, basal half or less suffused with light brown, outline of color indistinct; vein R_{2+3} curved upward meeting the costa at a right angle, petiole at tip of first posterior cell about equal in length to r-m crossvein, upper intercalary vein present, shorter than r-m crossvein, two submarginal cells, r-m crossvein beyond middle of discal cell, axillary cell at base wider than anal cell, alula well developed. Abdomen white pilose and tomentose, posterior margins of all segments except the first with long scraggly black hair, tomentum dense on apical segments; venter white pilose. Genitalia small, (Fig. 1), epiphallus thick, curved upward apically, rounded below, aedeagus short, straight, not projecting beyond epiphallus; dististylus not strongly hooked apically, concave on outer margin; basistylus boat-shaped, lower margin convex.

Female.—Eyes separated by four times width of ocellar tubercle; front with black hair laterally; tibiae light testaceous; proboscis projecting beyond oral margin for distance twice length of hind femur; a few white hairs at base of costa, white tomentum present on mesonotum, pubescence on abdomen much denser than in male, seventh sternite broadly rounded apically; otherwise as described for male.

Holotype female from ARGUS MTS., SAN BERNARDINO CO., CALIFORNIA, May 1891. In Snow Collection, University of Kansas. Painter, 1930 designated a male in the S. J. Hine collection as the androtype (sic).

Specimens have been studied from: California, San Bernardino Co., 17 ♂ ♀, Kramer Hills, IV-18-62 (J. C. Hall); 1 ♂, 5 mi. W. Desert Springs, IV-11-62 (J. C. Hall, E. I. Schlinger); 2 ♀, 20 mi. N. Adelanto, IV-18-62 (J. C. Hall, E. I. Schlinger); 4 ♂ ♀, Granite Pass, IV-27-68 (E. I. Schlinger, C. Beesly), 3800–4320 ft.; ♂ ♀, Phelan, IV-4-71, V-4-66 (T. Plichta, J. C. Hall); 12 ♂ ♀, 8 mi. N. Llano, IV-11-62 (J. C. Hall, E. I. Schlinger); ♀, Little Morongo Cyn.; V-1-62 (J. C. Hall). Riverside Co., 7 ♂ ♀, Riverside, IV-9-37, V-1-69, III-15-39, IV-2-69, IV-15-73 (P. H. Timberlake, J. C. Hall, M. E. Irwin, T. Plichta); 3 ♂ ♀, Palm Springs, III-5-33, III-24-35, III-3-71 (P. H. Timberlake, J. C. Hall); 4 ♂ ♀, Chuckwalla Mts., III-29-58 (G. M. Nicolls); ♀, Mecca, III-31-58 (F. Colley); ♀, 6 mi. S. Cottonwood Spgs., IV-5-66 (F. G. Andrews); 2 ♀, 11.5 mi. N.W. Alberhill, V-11-69 (J. C. Hall); ♀, Coyote Creek, III-22-63 (E. I. Schlinger); 1 ♂, Millard Cyn., IV-26-69 (B. Hunt); 1 ♀, 3 mi. E. Edom, III-14-37 (P. H. Timberlake); ♀, 3 mi. N. North Palm Springs, II-25-68 (M. E. Irwin); P. L. Boyd Desert Research Center, Deep Canyon, 3.5 mi. S. Palm Desert, numerous dates in April and May (various collectors). Imperial Co., 2 ♀, 6.2 mi. W. Glamis, III-2-69 (M. E. Irwin). San Diego Co., ♂, 4 mi. E. Jacumba, IV-31-66 (J. Wilcox); ♂, 5 mi. E. Calexico, I-27-73 (J. Pinto); ♂, Vallecito, III-15-68 (J. C. Hall); ♀, Fallbrook, V-1-60 (G. Goldman). Los Angeles Co., 3 ♂ ♀, Soledad Cyn., 3 mi. N. Acton, IV-27-67 (J. C. Hall). Kern Co., ♀, 14.4 mi. N. Johannesburg, III-27-71 (T. Plichta). Inyo Co., ♂ ♀, Nine Mile Cyn., IV-6-71 (T. Plichta). Arizona, ♀, 4 mi. E. Benson, Cochise Co., IV-10-63 (G. L. Stage); ♂ Aztec, Yuma Co., IV-16-41 (J. Wilcox, Jr.).

Triploechus luridus new species

Quite similar to *stagei*, new species from which it can be separated by the black basal antennal segments and the absence of black hair on the head.

Male.—9–10 mm. Ground color dull black, head cinereous, mesonotum with three gray stripes, palpi, base and sometimes apex of femora, tibiae, sides of apical

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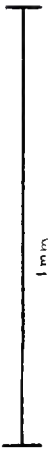
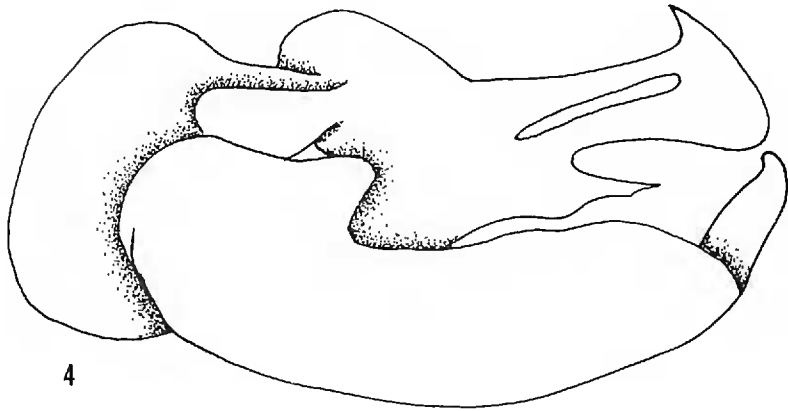
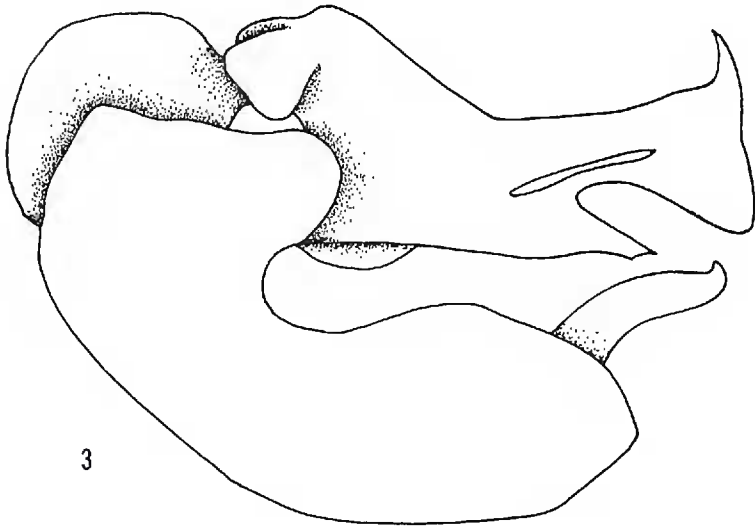
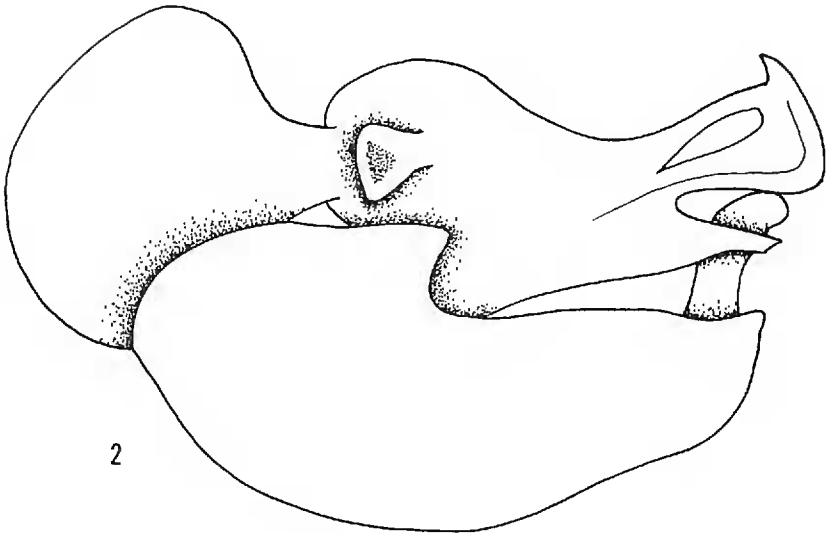
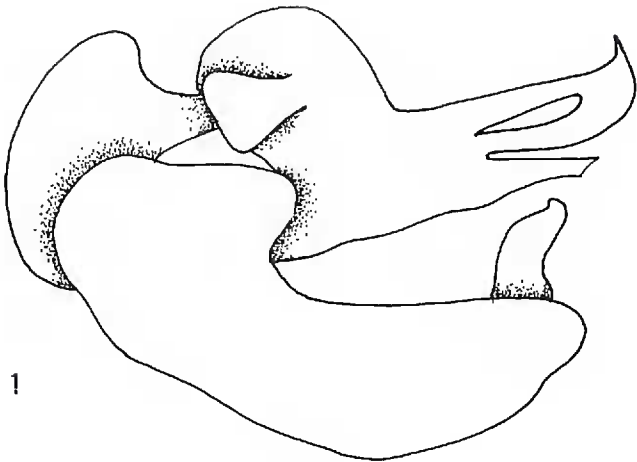
Lateral view of the male genitalia. All drawn at the same scale.

FIG. 1. *T. sackeni* (Will.)

FIG. 2. *T. luridus* n. sp.

FIG. 3. *T. novus* (Will.)

FIG. 4. *T. stagei* n. sp.



abdominal segments and nearly all of venter fulvous. Eyes separated by little less than width of median ocellus. Antennae black, first segment at least three times longer than second segment which is a little wider than long, third segment linear, tapering from base to acuminate apex, twice as long as two basal segments combined. Proboscis projecting one and one-half times length of hind femur beyond oral margin. Head white pilose as is first antennal segment, front with a narrow median longitudinal bare stripe from anterior ocellus to base of antennae. Body pile whitish to pale yellow, lighter on pleura, legs and venter. Apical bristles on hind femur thin, hair-like. Pulvilli more than half length of claws. Squama brownish with fringe of pure white hair. Halter stem testaceous, knob white. Basicosta with whitish-yellow hair and black setulae. Wing hyaline, lightly suffused with brown on basal half, outline of color indistinct; apex of vein R_{2+3} curved upward meeting costa at right angle; petiole of first posterior cell as long as r-m crossvein; upper intercalary vein small; r-m crossvein beyond middle of discal cell; axillary cell wider than anal cell on basal half; alula well developed, hyaline. Abdomen entirely pale yellowish to white pilose, tomentum of same color not dense, scattered on apical segments. Genitalia small, (Fig. 2), epiphallus, in lateral view parallel sided, apex curved upward rounded and slightly lobed below; aedeagus straight, projecting about half length of epiphallus; dististylus not apically hooked, curved outward; basistylus narrow, lower margin broadly curved.

Female.—Eyes separated by four times width of ocellar tubercle; front with yellow tomentum, body pile and tomentum yellowish; wing nearly entirely hyaline, brown coloring light, legs entirely fulvous. Otherwise as described for male.

Holotype male and *allotype* from P. L. BOYD DESERT RESEARCH CENTER, 3 MI. S. PALM DESERT, RIVERSIDE, CALIFORNIA, III-28-73, IV-10-73 (A. Tabet). Both in California Academy of Sciences.

Paratypes. Four topotypic collected with types. 1 ♂, Borrego, Riverside Co., California, IV-19-41 (J. Wilcox, Jr.); 2 ♂, 25 mi. N.W. New Cuyama, Santa Barbara Co., California, VI-8-63 (G. I. Stage).

TRIPLOECHUS NOVUS (Williston)

Triplasius novum Williston, 1893: 254.

Heterostylum vierecki Cresson, 1919: 186 new synonymy.

Bombylius recurvus Coquillett, 1902: 100.

Heterostylum novum, Painter, 1940: 279.

Triploechnus novum, Paramonov, 1947: 191; Painter and Painter, 1965: 411.

(as a subgenus of *Heterostylum*); Hull, 1973: 141.

Triploechnus vierecki, Painter and Painter, 1965: 411 (as a subgenus of *Heterostylum*).

T. novus is a widespread species commonly found in the deserts of Arizona and California. Because of the rather wide distribution a considerable amount of variation is present particularly in the distribution of the black hair on the head and body. Likewise, most of the specimens studied have only two submarginal cells, some have two in one wing and three in the other and some have three submarginal cells in each wing. In nearly all of the specimens with two submarginal cells there is a stump

of a vein projecting downward towards vein R_4 which if continued would form the third cell.

In general the females have paler hair than the males. The major differences noted between *vierecki* and *novus* are the white hair and shape of the antennae and more abundant black hair on both the scutellum and the abdomen. In a series of specimens collected at the same time and place variation in all three characters is evident. The females usually have mostly white hair on the antennae while in the males the black predominates. The shape of the antennae varies according to what angle viewed from. The scutellum may be entirely black haired, with only one or two black hairs, or any gradation between. Several conditions are found on the abdomen; black hair on segment two and at apex only, on segments two and three or on two, three and four as well as at the apex. The ground color of the fourth and fifth abdominal segments is also subject to considerable variation. It may be as in *vierecki*, that is, pale except for median spots of black or only one of the two segments pale or both entirely black. I have two specimens which have the sides of all the segments except the first pale. A study of the male genitalia (Fig. 3) leaves little doubt as to the synonymy listed above.

This species is known throughout southern California, Arizona, New Mexico and Texas. Most of the specimens were collected in April.

Triploechus stagei new species

Readily separated from other species by the nearly entirely fulvous legs and first antennal segment.

Male.—9–10 mm. Ground color dull black, head cinereous; first antennal segment, upper side of face somewhat, legs except coxae and trochanters, sides of fourth and following abdominal segments and genitalia partially fulvous. Eyes nearly contiguous above, separated by about width of a single ommatidium. First antennal segment four times longer than square second segment, third segment linear, gradually tapering from base to apex, about one and one half times longer than two basal segments combined. Front with black to brown hair becoming yellowish towards side below; ocellar tubercle and first antennal segment above with black hair, the latter with pale yellow hair at side and below. Face yellow pilose, with black hair laterally above, white hair on underside of head and on occiput. Proboscis projecting beyond oral margin for a distance about equal to length of hind femur. Body pile pale yellow to light yellowish-gray, lighter on pleura and venter. Legs white to pale yellow pubescent, mid and hind femora with scattered black hair on antero-ventral surface, bristles on hind femur on apical half only; pulvilli nearly as long as claws. Squama brownish with fringe of long pale yellowish hair. Halter stem flavo-testaceous, knob white. Basicosta with short whitish hair and black setulae; costa not tuberculate. Wing hyaline, basal

half suffused with brown, color not sharply delineated; vein R_{2+3} curved upward at apex to meet costa at nearly a right angle; petiole of first posterior cell as long as r-m crossvein; upper intercalary vein short; r-m crossvein a little beyond middle of discal cell; axillary cell at base much wider than anal cell; alula well developed. Abdominal dorsum pale yellowish to whitish pubescent, long black hair across posterior margin of all segments except the first; tomentum consists of short, recumbent, somewhat curly hair. Venter white pilose, a few black hairs present at apex. Genitalia small, (Fig. 4), epiphallus curved upward apically, lower portion of tip of epiphallus somewhat lobed; aedeagus short extending about half length of epiphallus; dististylus not strongly hooked apically, posterior margin nearly straight; basistylus narrow, curved below.

Female.—Eyes separated by two and a half times width of ocellar tubercle. Front entirely yellow pilose, a few black hairs present on each side at vertex, bare stripe present down front from ocellar tubercle to antennae. Side of abdomen fulvous at base, last three or four segments entirely fulvous. Wing coloring lighter than in male. Body pile and tomentum more yellowish, tomentum more dense. Otherwise as described for male.

Holotype, *allotype* and seven paratypes from SAN FELIPE, BAJA CALIFORNIA, MEXICO, III-27-63 (G. I. Stage). Types in California Academy of Sciences.

LITERATURE CITED

- COQUILLETT, D. W. 1902. New Diptera from North America. Proc. U.S. Nat. Mus., (1903) 25: 83-126.
- CRESSON, E. T. 1919. Dipterological Notes and Descriptions. Proc. Acad. Nat. Sci. Philadelphia, 71: 171-194.
- EDWARDS, F. M. 1936. Bombyliidae from Chile and Western Argentine. Rev. Chilena Hist. Nat., 40: 31-41.
- HULL, F. M. 1973. Beeflies of the World. The Genera of the Family Bombyliidae. U.S. Nat. Mus. Bull., 286, 687 pp.
- PAINTER, R. H. 1930. A review of the Bombyliid Genus *Heterostylum* (Diptera). Jour. Kansas Entomol. Soc., 3(1): 1-7.
- PAINTER, R. H. 1940. Notes on Type Specimens and Descriptions of New North American Bombyliidae. Trans. Kansas Acad. Sci., 42: 267-301 (1939).
- PAINTER, R. H. AND E. M. PAINTER. 1965. Family Bombyliidae in Stone et al.: A Catalog of the Diptera of America North of Mexico. Agric. Res. Serv., U.S. Dept. Agric. Handbk., 276: 407-446.
- PARAMONOV, S. J. 1947. Zur Kenntnis der Amerikanischen Bombyliiden-Gattung *Triploechus* Edw. (Diptera). Rev. de Entomol., 18(1-2): 183-192.